REMARKS

Claims 1-13 have been rejected under 35 U.S.C. §103(a) as unpatentable over Benz et al (U.S. Patent No. 6,187,066) in view of European patent application EP 0 968 958 A1 (Abe et al). However, for the reasons set forth hereinafter, Applicants respectfully submit that all claims of record in this application distinguish over the cited references, whether considered separately or in combination with other references.

The present invention is directed to a method of operating a gas generating device in such a manner as to achieve improved cold starting properties. (That is, the device is brought to a proper operating temperature quickly.) For this purpose, the gas generating system is provided with at least two gas generating units, which are arranged sequentially in the gas flow path. During a starting operating, only the upstream gas generation unit is operated, with heat being supplied from an external source. In order to hasten the heating of the first gas generation unit, during the starting phase, it is operated with a power, and/or at a temperature, that exceeds the rated capacity of the unit. That is, it is operated with a power and/or at a temperature which lies above the values encountered in normal operation of the gas generation device, and at which the device can be run continuously. (See specification, paragraph [0007], lines 6-11; paragraphs [0024] – [0027]; and paragraph [0032].) Such "overload

operation" causes the upstream gas generation unit to come rapidly to its proper operating temperature. Although such overload operation shortens the life of the unit, it is compensated by operating that unit only during startup operation, and during periods of time in which the output required of the gas generating device exceeds that of the downstream gas generation unit. Moreover, because hot gases flowing from the upstream gas generation unit heat the downstream gas generation unit, the latter is brought more quickly to its operating temperature.

As noted previously, the Benz et al reference differs fundamentally from the present invention in that it discloses neither a gas generating system nor a method of operating a gas generating system. Rather, it relates to a "device for providing heat energy for a gas-generating system...", or in other words, a heater unit. Applicants' comments regarding the significance of this difference are set forth in detail in the Remarks which accompanied the amendment submitted November 1, 2004, which are incorporated herein by reference.

EP '958, on the other hand, is discussed in the specification of the present application at paragraph [0005]. As noted there, it discloses a multi-stage reformer which has at least one subunit with a reduced thermal mass (compared to the other subunits).

Both of independent Claims 1 and 12 of the present application define a method of operating a gas generating device in which the gas generating device

has at least two gas generation units arranged sequentially in the gas flow stream. In addition, both of Claims 1 and 12 recite that during a starting phase, only the first gas generation unit is operated, with a power or at a temperature which exceeds the rated power or temperature of the unit. As noted previously, such operation, which can be tolerated only for limited periods of time, speeds up the heating of the gas generation unit, so that the overall system is brought to temperature more rapidly. This feature is neither taught nor suggested by either Benz et al or EP '958.

With regard to the latter feature, the Office Action states that Benz et al discloses such overload operation at Column 3, lines 49-53 and 58-67, as well as Column 4, lines 1-5. However, Column 3, lines 49-53 make no mention of overload operation. Rather, they simply state that a cold start, a reduced quantity of fuel/air mixture is conducted through the cold start component 3, which is electrically heated. In fact, such provision of a reduced quantity of fuel/air mixture simply implies a limit on the operating output of the cold start component. Nothing contained in this discussion suggests operation of the unit at a temperature or at a power level which exceeds its rated capacity, as described previously.

Similarly, Column 3, lines 58-67 of Benz et al merely describes the procedure which is followed when the starting material in the central component two reaches its operating temperature. At this point, the gas flow is diverted

around the cold start component, so that only the central component 2 is operated. Once again, this discussion implies nothing regarding whether the cold start unit is operated at a temperature or a power output which is above its rated capacity.

Finally, the discussion at Column 3, line 67 through Column 4, line 5 states only that it is necessary to switch the valve 10 so that the cold start unit is bypassed during warmed up operation, since if a fuel/air mixture were conducted through the cold start component, during warmed up operation, that would lead to overheating in the case of high fuel concentrations, causing damage to the catalyst. Accordingly, the latter discussion pertains only to operation of the system after the cold start period, and once again contains no suggestion that during the cold start period, the cold start unit is operated at a temperature of power which exceeds its rated capacity.

On the other hand, the Office Action does not suggest that the EP '958 reference discloses operation of the upstream catalyst unit at a temperature or power level which exceeds its rated capacity during starting. Moreover, Applicants have carefully reviewed that document, and insofar as they have been able to determine, it contains no disclosure which suggests such a manner of operation. Rather, rapid heating of the system is achieved only through the device of providing the upstream catalyst unit with a heat capacity which is less than the heat capacity of the downstream catalyst unit, as mentioned previously.

Accordingly, EP '958 contains no disclosure which suggests a modification of the Benz et al patent in order to replicate the present invention as defined in Claims 1 and 12.

In addition, Claims 2 and 13 further specify that after the starting phase has ended during periods of low and medium load, only the second gas generation unit is operated, while the first gas generating unit is operated when the required power from the system exceeds the rated power of the second gas generation unit. This aspect of the invention is discussed in paragraphs [0010], [0011], and [0022]. As indicated there, it enhances the dynamic response of the system, without substantially shortening the life of the upstream gas generating unit due to its overload operation during starting. This feature of the invention is also neither taught nor suggested in either of the cited references.

With regard to this feature of the invention, the Office Action states at the bottom of page 4 that Benz et al discloses an operating mode in which, after the starting phase is ended, only the second gas generation unit is operated in the event of a low and medium load, but fails to teach or suggest that the first gas generation unit is operated only when a required power output exceeds the rated power of the second gas generation unit. This feature is said to be suggested by the proposition, as noted at Column 5, lines 13-21, which, with reference to Figure 3, acknowledges that during hot operation, the mostly reacted fuel/air mixture continues to flow through the cold start component 3. However, as can

be seen from an inspection of Figure 3, the apparatus provided there contains no mechanism by which this phenomenon could be regulated. That is, it contains no mechanism for selectively operating the cold start unit 3 only during periods in which the total output of the device exceeds the rated capacity of the central component 2. Nor is there any discussion of the rated capacity of the central component 2.

While the embodiments of Figures 1 and 2 both contain a two-way valve 10, by which the fuel/air mixture can be either routed through the cold start component 3 or around it, nothing in Benz et al suggests the operation of that valve in response to a determination of whether the power output demanded of the unit exceeds the rated capacity of the central component 2, which is not discussed. In fact, the opposite is true, in that, as noted previously, the disclosure states at Column 3, line 67 through Column 4, line 5 that it is necessary to divert the reactant gases around the cold start component 3 during warmed up operation, since "no fuel/air mixture should be conducted through the cold-start component 3 since this would lead to overheating in the case of high fuel concentrations, and hence cause damage to the catalyst material in the cold-starting component 3".

Accordingly, the Benz et al reference teaches away from the operating method according to Claims 2 and 3. Moreover, nothing contained in EP '958 teaches or suggests such a manner of operation, either. Nor is there any

disclosure of a mechanism in EP '958, which could implement such a method. The latter comments reply also to Claims 8 and 9.

In light of the foregoing remarks, this application should be in condition for allowance, and early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #1748X/49969).

Respectfully submitted,

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